UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,783	11/08/2001	Brad R. Lewis	30014200-1005	3403

			EXAMINER
26263	7590	08/13/2004	PAN, DANIEL H

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ART UNIT	PAPER NUMBER
2183	

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Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/005,783	LEWIS ET AL.
	Examiner	Art Unit	
	Daniel Pan	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>08 November 2001</u>.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-56</u> is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) <u>1</u> is/are allowed.
6) ☒ Claim(s) <u>2-10,14-34 and 38-56</u> is/are rejected.
7) ☒ Claim(s) <u>11-13 and 35-37</u> is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on <u>05 March 2002</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____.
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
       application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 1-04)   Office Action Summary   Part of Paper No./Mail Date 20040804

Claims 1-56 are presented for examination.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1.   Claims 2, 5-10,14-16, 26,29, 30-34,38 39,   43,   44, 46-51, 53 rejected under 35

U.S.C. 103(a) as being unpatentable over Calder et al. (5,963,972) in view Motoyama

et al. (5,535,318).

2.   As to claims 2,26,43, 53, Calder disclosed a system including at least :

a) dividing a memory area into blocks (cache lines, or colors, see identifications of

cache lines as colors in col.4, lines 29-40) and associating each block with a portion of

data and one code segment [procedures] (e.g. see he mapping of the flow graph 100

into cache memory in col.3, lines 56-62, see also the memory size with corresponding

code segment procedures] in table 1 col.4, lines 8-17, see also fig.4 for the detailed

information of the data and code segment mapped into he cache memory);

b) generating a graph representation of the dataflow program, comprising nodes

associated with blocks (unit of instructions, or procedures), an dependencies between

the blocks that provide execution order (see the nodes representing the units of

instructions and the directions of execution relationships in fig.1,, fig.4, col.3, lines 55-

66, see the order of execution and the conflicts in col.7, lines 6-56, col.8, lines 10-54,

see the reordering sequence in col.11, lines 10-22, see also the dependencies in col.12,

lines 25-37).

3.   Calder did not specifically showed the command for debugging into eh graph as

claimed . However, Motoyama disclosed a system for including a debug command

(see fig.19, col.14, lines 63-64). It would have been obvious to one of ordinary skill in

the at o use Motoyama in Calder for including the debugging command as claimed

because the use of Motoyama could provide Calder the control ability to monitor the

program execution flow, thereby enhancing the predictability the program execution

results, and it could be readily achieved by defining the debug command of Motoyama

into the Calder with modified configuration parameters, such as the command type and

run mode, so that the specific debugging command of Motoyama could be recognized

by Calder in order to increase the processing capability of Calder 's control graph, and

in doing so, provided a motivation.

4.   As to claims 5, 44, Motoyama also included step debugging command (see the

debugging command at each program steps in col.13, lines 25-42, see also col.14, line

13 STEP).

5.   As to claims 6,7, 29, 30, 31,46, 51, Motoyama also included single step

breakpoint (see breakpoint at next point in col.14, lines 65-67, col.15, lines 1-14, see

also col.14, line 13 STEP).

6.   As to claims 8,32, 47, Motoyama also included none after breakpoint (see the

col.15, lines 35-39).

7.   As to claims 9, 33,48, Motoyama also included all before breakpoint (e.g. see

the advancing of the breakpoint in col.15, lines 43-51).

8.   As to claims 10,34, Motoyama also included a task node breakpoint command

(see the break point [2] in fig.16).

9.   As to claim 14, Motoyama also included visualization of the breakpoint node (e.g.

see the display break in col.14, lines 5-32).

10.   As to claims 15,38, 49, 50, Motoyama also reordered the breakpoint sequence

(see the second breakpoint and the first breakpoint in linked list in col.13, lines 52-65).

11.   As to claims 16,39,   Calder also included determination of dependencies

(conflicts), and execution to satisfy the dependencies (see the nodes representing the

units of instructions and the directions of execution relationships in fig.1,, fig.4, col.3,

lines 55-66, see the order of execution and the conflicts determinations in col.7, lines

6-56, col.8, lines 10-54, see the reordering sequence in col.11, lines 10-22, see also the

dependencies in col.12, lines 25-37).

12.   Claim 3, 4, 17, 18, 19, 27, 28, 40,41,42, 45 , 52   are rejected under 35

U.S.C. 103(a) as being unpatentable over Calder et al. (5,963,972) in view Motoyama

et al. (5,535,318) as applied to claims 2, 26, 43   above, and further in view of Kitamura

(5,457,806).

13.   As to claims 3,27, 45, 52, neither Calder nor Motoyama disclosed the replay

command as claimed. However, Kitamura disclosed a replay command for debugging

process (e.g. see col.2, lines 28-37, col.6, lines 35-38). It would have been obvious to

one of ordinary skill in the art to use Kitamura in Calder for including the replay command as claimed because the use of Kitamura could provide Calder the ability to reactivate the debugging process for more than one processor in a network environment, therefore expanding the processing structure of Calder's system, and Calder already taught the cache used to map the data flow graph, and did express the concern of the cache performance among the today processors (e.g. see col.12, lines 25-26), it would have been an indication of replaying the debugging command into a multiplicity of processors, and for the above reasons, provided motivation.

14. As to claims 17,18,19, 40,41, 42, Kitamura also included a secondary storage for storing the graph status, the time stamps (e.g. see col.6, lines 35-39 for the replay command as second operation mode, see the recordation of current time for the replay status in col.7, lines 38-42).

15. As to claims 4, 28, Kitamura was also directed to dependencies modification command (e.g. see the sequence of the message exchange depending on the status of a proceeding computers in col.8, lines 54-61).

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16.   Claims 20-24, 54-56 are rejected under 35 U.S.C. 102(a) and (b) as being

anticipated by Motoyama et al. (5,535,318)

17.   As to claim 20, Motoyama disclosed at least :

a) initiating execution of data flow program (see fig,.20, col.14, lines 65-67, col.15, lines

1-25);

b) executing a debugging command on data flow program (see the debugging

command in fig.20, col.14, lines 65-67, col.15, lines 1-25);).

18.   As to claim 21, Motoyama also determined data dependencies between the

nodes and enqueued the nodes (e.g. see the determination of the previous breakpoint

at the next entry node and the created new breakpoint linked list data structure in

col.15, lines 5-25).

19.   As to claim 22, Motoyama also included execution of breakpoint debugging

command (see col.14, lines 9-15, EXECUTE).

20.   AS to claim 23, Motoyama also included dependency modification debugging

command (see the set command for setting the previous pointer in col.14, lines 66-67,

col.15, lines 1-14).

21.   As to claim 24, Motoyama also disclosed a step debugging (see col.14, line 13 ,

STEP).

22.   As to claim 54, Motoyama disclosed nodes (see codes associated with

respective break lines 10,5,15 I fig.16, see also fig.18 for information regarding each

node), assigned to a data processed by data flow program comprising code segments,

the nodes also assigned to one code segment; dependencies between the nodes (see

breakpoints [1,2,3] in sequence in fig.18); debugging information specified by debug

command [see debug set at line 10,5,15 in fig.16), wherein data flow accessed the data

structure (see the linked list in fig.18) to execute debug command (see the debug

commands in fig.16, see also col.13, lines 18-65 for the linked list of the breakpoints, or

nodes).

23. As to claim 55, Motoyama also included identification of the breakpoint nodes

[1,2,3]] (see fig.18).

24. As to claim 56, Motoyama also included step debugging (e.g. see col.14, line 13

STEP , col.14, lines 19-33).

25. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Motoyama (5,535,318) in view of Kitamura (5,457,806).

26. As to claim 25, Motoyama did not specifically show the replay command as

claimed. However, Kitamura disclosed replay command (col.6, lines 35-39). It would

have been obvious to one of ordinary skill in the art to use Kitamura in Motoyama for

including the replay command as claimed because the use of Kitamura could provide

Motoyama the processing capability to initiate the debugging process for multiple

processors in a network system, thereby enhancing the adaptability of Motoyama's

debugging system for specific processor in the network, and it could be readily achieved

by configuring the replay command of Kitamura into Motoyama with the specific control

variables (command width, and command type) so that the replay command of

Kitamura could be recognized by Motoyama to enhance the applicability of the debug command at a different processor, and for the reasons given above, provided a motivation.

27.   Claims 11-13, 35-37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the combined features of the single point breakpoint and none after break point command (claims11, 35) , single point breakpoint and all before breakpoint command (claims 12,36) , and the single point breakpoint , none after breakpoint, and all before breakpoint command (claims 13,37).

28.   Claim 1 is allowable over the art of record for reciting the combined features of the block divided memory area extending over the data set, the memory blocks associated with the code segments and data sets, read and write identifiers written or read by the code segment, the determination of dependencies based on the read and write identifiers, the acyclic graph with the arcs representing determined dependency and nodes, and the determination of the received debug command.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Pan whose telephone number is 703 305 9696. The examiner can normally be reached on M-F from 8:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chan, can be reached on 703 305 9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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